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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,979	02/23/2004	Shiro Suyama	32307-201092	2620
26694	7590	05/10/2007		
VENABLE LLP P.O. BOX 34385 WASHINGTON, DC 20043-9998			EXAMINER SHENG, TOM V	
			ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/782,979	Applicant(s) SUYAMA ET AL.	
	Examiner Tom V. Sheng	Art Unit 2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 44-61 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 47,48 and 53-60 is/are allowed.
- 6) ☒ Claim(s) 44-46 and 52 is/are rejected.
- 7) ☒ Claim(s) 49-51 and 61 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/21/2006 has been entered.

Claim Objections

2. Claim 49 is objected to because of the following informalities:

As for claim 49, lines 8-12, "wherein the shutter elements are arranged at a real position according to a depth position where the depth sampled images are displayed as optical real images, and the shutter elements are photoreactive elements for lowering a light transmittance in a region of the depth sampled images at the positions of the shutter elements according to the real position" should be corrected as "wherein the shutter elements are arranged at real positions according to depth positions where the depth sampled images are displayed as optical real images, and the shutter elements are photoreactive elements for lowering a light transmittance in a region of the depth sampled images at the positions of the shutter elements according to the real positions". Appropriate correction is required.

Claim Rejections - 35 USC § 112

Art Unit: 2629

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 46 recites the limitation "the region" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 44-45 are rejected under 35 U.S.C. 102(b) as being anticipated by Buzak (US 4,670,744).

As for claim 44, Buzak teaches a three-dimensional display device (display system 10; fig. 1) comprising:

a phantom three-dimensional display device (CRT 12 with screen 14) for displaying a phantom three-dimensional image comprised of an aggregation of depth sampled images in a depth direction (can emit a sequence of two-dimensional images that correspond to different depth planes of a three-dimensional subject; column 4, lines 36-45); and

a shutter device having a plurality of shutter elements (first and second light direction modulating means 16 and 18; column 4, lines 45-56; also additional first modulating means 16 can be provided, increasing the number of depth planes, thus

enhancing image resolution; column 5, lines 17-25) for controlling a light transmittance of the displayed phantom three-dimensional image (control signals are provided to synchronize the first modulating means 16 and second modulating means 18 to reflect corresponding depth plane images; column 4, lines 57-66) and having control means for controlling selection of the shutter elements (control circuit 22, using the control signals, activates the first modulating means 16 and the second modulating means 16 in synchronization with the depth plane images sequence emitted from the screen 14; column 4, line 67 through column 5, line 29);

wherein the shutter elements are arranged at positions where the displayed phantom three-dimensional image is located in a depth direction (the one or more first modulating means 16 and the second modulating means 18 are positioned at respective depth planes on optical axis 20), and each of the shutter elements is selected in a time division manner respectively so as to vary the light transmittance of the displayed phantom three-dimensional image in the depth direction (the modulating means are controlled to reflect depth plane images in sequence, thus a time division manner, in order to produce a three-dimensional image of the subject; column 5, lines 2-29).

[Since the depth plane images are produced on screen 14 and emitted along optical axis 20, and the positions of each image to be reflected are directly dependent on the positions of the first and second modulating means, Buzak broadly teaches the limitation "wherein the shutter elements are arranged at positions where the displayed phantom three-dimensional image is located in a depth direction."]

As for claim 45, the first and second modulating means are two-dimensional and spaced apart to respectively reflect the sequence of plane images from screen 14. Thus, Buzak's modulating means are two-dimensionally divided in a plane perpendicular to the depth direction of the displayed phantom three-dimensional image and are individually controlled.

7. Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sudo (US 5,880,883) in view of Buzak.

As for claim 52, Sudo teaches a head-mount display device (fig. 43) comprising: two display devices corresponding to left and right eyes (image display 1 and optical system 30 on each side; column 24, lines 27-64) wherein each device includes a two-dimensional display device (image display 1 displays an inherently two-dimensional image) and an optical device (optical system 30).

Sudo further teaches a control device for controlling said two dimensional display device (image signal generating portion 2 and magnification modulator 7) and said optical device (the lens 3R' with variable focal length inherently is controlled by a control device), said display devices are mounted to left and right eyes (as shown), and said control device synchronously drives said two-dimensional display device and said optical device to perform three-dimensional display (stereoscopic display due to both parallax and size difference of left and right images; column 25, lines 1-16. Inherently, the lens and the display on each side work in sync to produce the stereoscopic display.).

However, Sudo does not teach that the left lens 3L also has a variable focal length. Also, Sudo does not teach wherein the control device controls the display and optical devices so that the focal lengths of the optical devices are focused on the positions of the depth sampled images.

Buzak teaches display of a three-dimensional image by sequentially emitting from an image source representing different depth planes of a three-dimensional subject. Each depth plane image is typically reflected by a mirror to a different optical path length (column 1, lines 15-32). Buzak further teaches one conventional method by means of a varifocal mirror. The mirror is vibrated to provide different focal lengths in synchronization with the display of the depth plane images (column 1, lines 52-62).

One of ordinary skill in the art would recognize that a more realistic three-dimensional image of Buzak could similarly be produced in Sudo's head-mount display by replacing mirrors 5 with varifocal mirrors together with the use depth plane images of a 3-D object. Moreover, lenses 3 can be made fixed or even do without.

Therefore, it would have been obvious to incorporate Sudo's head-mount stereoscopic display with Buzak's varifocal mirrors and depth plane images, as the resulting display would be highly three-dimensional due to the use of both stereoscopic and depth plane image display means.

Allowable Subject Matter

Claims 47, 48 and 53-60 are allowed.

Claim 49 is objected because of minor error and would be allowable upon correction. Claims 50-51 are dependent on claim 49.

Claim 61 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 46 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: none of the prior arts of record teaches, inter alia, the limitations

"wherein a predetermined shutter element lowers a light transmittance in a region of the displayed phantom three-dimensional image at each position of the shutter elements controlled by the control means when the phantom three-dimensional image is located in the depth direction in a time division manner" of claim 46,

"wherein the shutter elements are arranged at positions where the depth sampled images are displayed in a depth direction" and "wherein the material of said shutter element is ..." of claim 47,

"wherein the shutter elements are arranged at positions where the depth sampled images are displayed in a depth direction" and "wherein said phantom three-dimensional display device is constructed with a two-dimensional image display device and a varifocal optical device" of claim 48,

"wherein the shutter elements are arranged at real positions according to depth

positions where the depth sampled images are displayed as optical real images, and the shutter elements are photoreactive elements for lowering a light transmittance in a region of the depth sampled images at the positions of the shutter elements according to the real positions” of claim 49,

“controls said optical device in such a way that when the image is moving closer to the eyes according to a change of the focal length, the overall display image of said two-dimensional display device is deflected to be closer toward the center between the left and right eyes” of claim 53,

“wherein said optical device has a transparent material, a layer including a variable refractive index material, and at least a pair of transparent electrodes for sandwiching said layer, and wherein the transparent material is comprised of one of forms of a fixed focus lens shape, a fixed prism shape, and a shape where the fixed deflection mechanism is incorporated into the fixed focus lens” of claim 54,

“wherein said driving device sequentially applies voltages V_1 to V_N having primary frequencies f_1 to f_N ($N \geq 2$) to said transparent electrodes for a predetermined period of time and at a predetermined interval” of claim 61.

Response to Arguments

8. Applicant's arguments with respect to claims 44-46 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Art Unit: 2629

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom V. Sheng whose telephone number is (571) 272-7684. The examiner can normally be reached on 9:00am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Tom Sheng

AMR A. AWAD
SUPERVISORY PATENT EXAMINER

